

Gravina Access Project
Increasing Ferry Capacity
Between Ketchikan and Gravina Island
Technical Memorandum



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1.0 Introduction

This report summarizes the results of a conceptual evaluation of increasing ferry capacity as a means of improving access between Ketchikan and Gravina Island. The evaluation involved determining the best means for increasing ferry capacity, quantifying rational capacity increases and developing conceptual cost information. This information is intended to support a comparison between increased ferry capacity and alternate means of improved access (bridges, tunnels).

2.0 Means for Increasing Ferry Capacity

The existing ferry service consists of one full-time vessel (year round) and one part-time vessel (five days per week from mid-May to mid-September). Both vessels operate 16 hours per day. Any of the following changes will increase capacity:

Increase number of trips per day with the existing vessels. Increasing the number of trips per day can be accomplished by decreasing cycle time or increasing the hours of operation. Cycle time is dependent upon load/unload times and vessel transit speed. For short routes, the former is the limiting factor. The load/unload cycle time is directly related to the number of vehicles and passengers carried. Because these numbers need to be increased, decreasing load/unload cycle time is not viable. The current operation of 16 hours lends itself to two crews. Increasing this number would likely require an additional crew, which would make 24-hour service possible. The current demand for service is not uniformly distributed throughout the day. With these thoughts in mind, increasing the number of trips per day with the existing vessels is not a practical means to meet increased demand.

Use larger vessels. Using larger vessels adds more space for vehicles and passengers. More vehicles and passengers per trip means longer turn-around times. As noted above, for short routes, load/unload times limit the trips per day. It may be possible to make small improvements in capacity by using slightly larger vessels; however, a large improvement (increasing capacity by 75% or more) is not practical due to the increase in turn-around times.

Add vessels to the existing route. The current service uses an additional ferry to boost capacity during the peak demand months (May through September). This is a practical means for increasing capacity, but it is limited to two boats per route terminal. If more than two boats travel on a route of this length, one or more vessels will be waiting to load/unload and system capacity does not increase.

Add a new route and vessels. Adding routes or terminals and ferries allows for significant increases in capacity. A new route would be superior to simply adding a terminal on the existing route, because it would ease traffic congestion. Incremental increases can result by adding one new route with one vessel, then adding a vessel to the new route, then adding a second new route with one vessel, and finally adding a second vessel to the second new route. Figure 1 depicts the existing route. Figures 2 through 4 identify likely new routes.

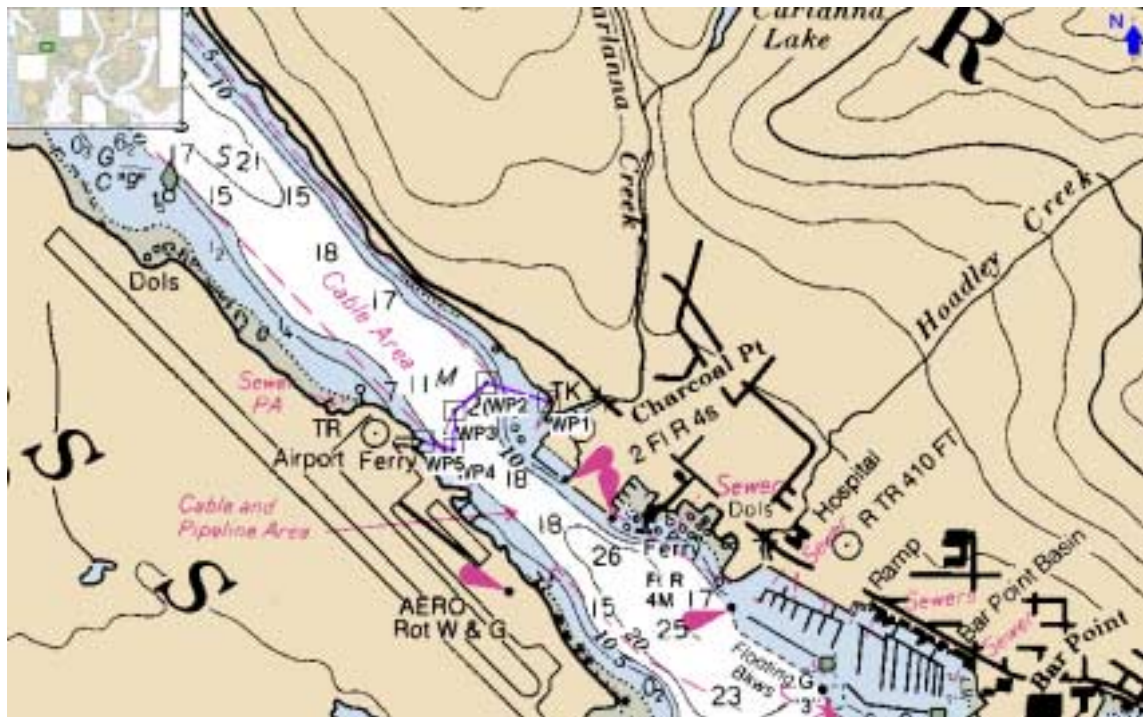


Figure 1
Existing Ketchikan Airport Ferry Route from Charcoal Point
to Gravina Island at Airport (0.33 n.m. one-way sailing distance)

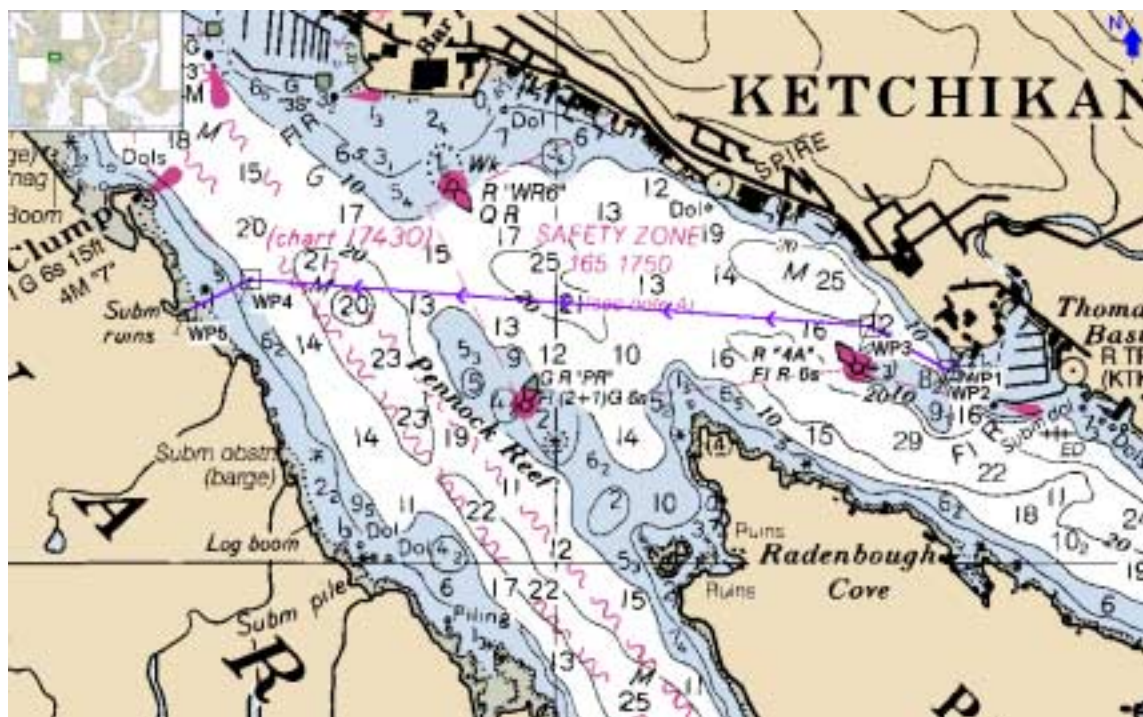


Figure 2
New Ferry Route G3 from Downtown Ketchikan to Gravina Island
South of Airport (1.47 n.m. one-way sailing distance)

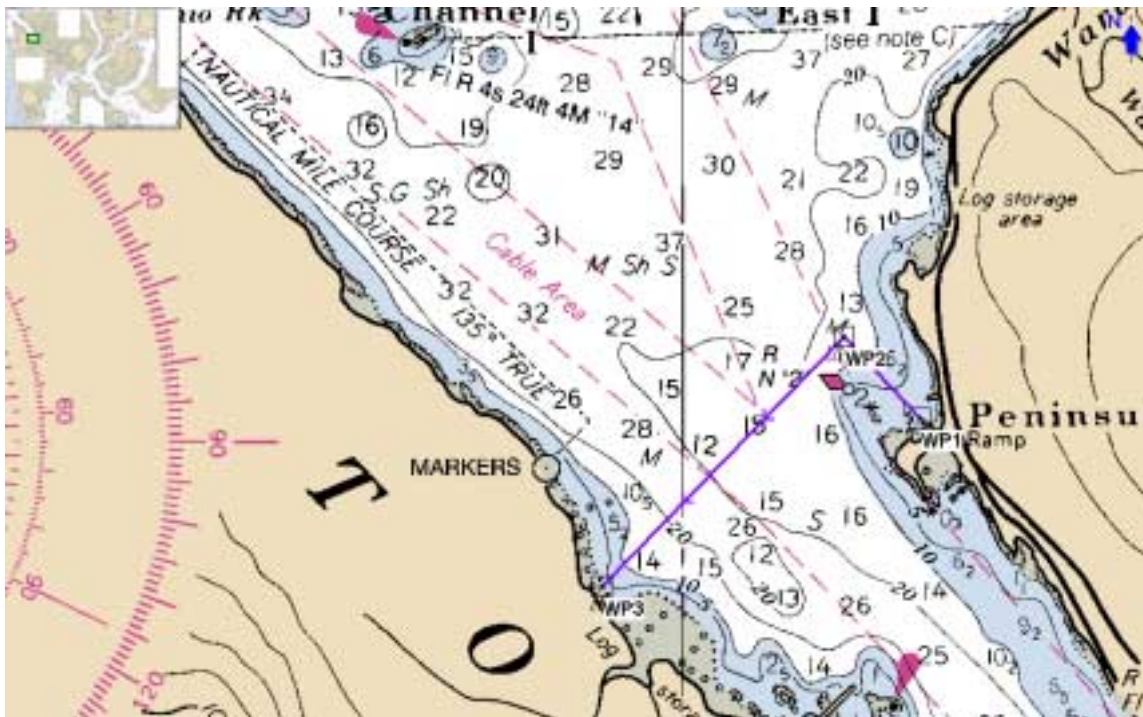


Figure 3
New Ferry Route G2 Alternative from Peninsula Point to Gravina Island
North of Airport (0.84 n.m. one-way sailing distance)

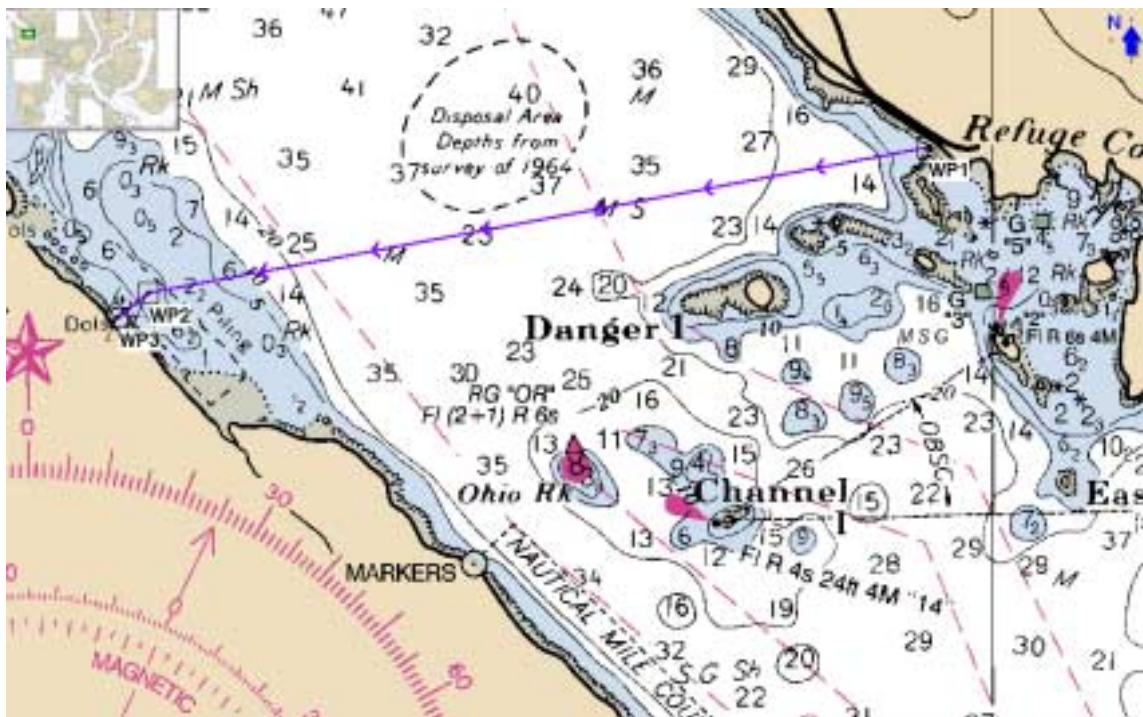


Figure 4
New Ferry Route G1 from North of Refuge Cove to Gravina Island
North of Airport (1.52 n.m. one-way sailing distance)

Speeds in Tongass Narrows are restricted by federal regulation as set forth in 33 CFR § 162.240 (b):

No vessel, except for floatplanes during landings and take-offs and non-commercial, open skiffs of less than 20 feet in length, shall exceed a speed of seven knots in the region of Tongass Narrows bounded to the north by Tongass Narrows Buoy 9 and to the south by Tongass Narrows East Channel Regulatory Buoy at position 55°19'22.0" N 131°36'40.5" W and Tongass Narrows West Channel Regulatory Buoy at position 55°19'28.5" N 131°39'09.7" W, respectively.

Figure 5 includes lines at the buoy locations described in the quoted passage from 33 CFR. Buoy No. 9 is located approximately adjacent to the north end of the Ketchikan Airport runway and south of Lewis Point. The speed restriction in West Channel ends just south of the narrowest point in West Channel and the speed restriction in East Channel ends at the narrowest point opposite Saxman.

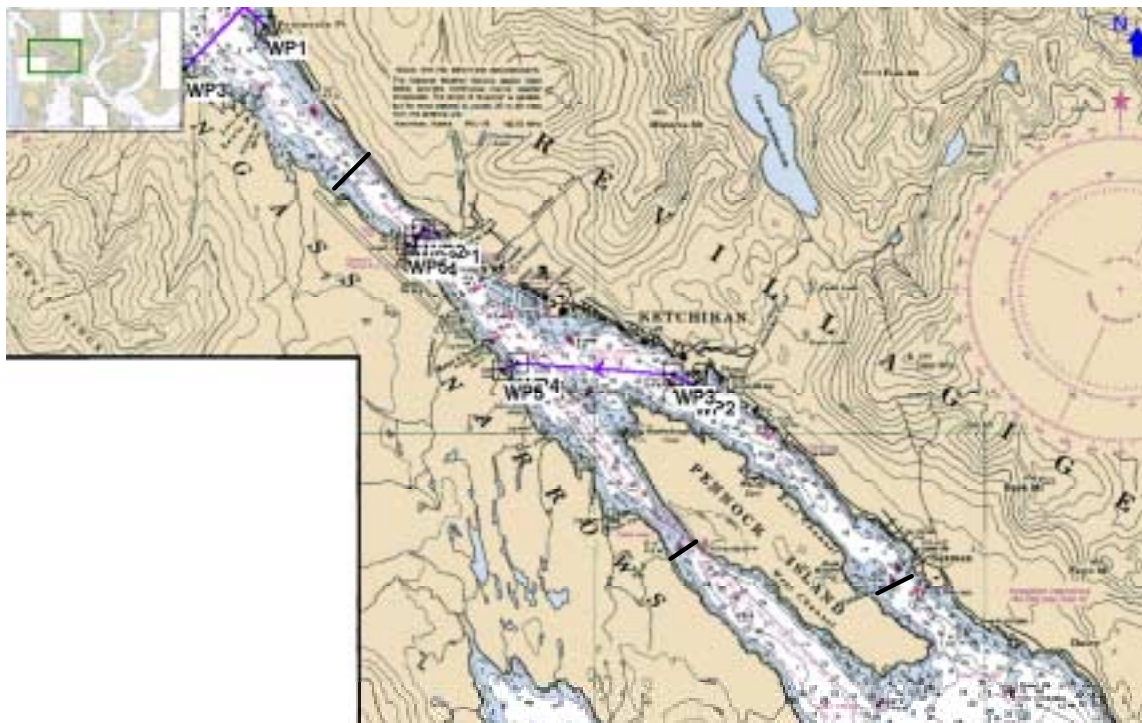


Figure 5
Tongass Narrows showing the speed restricted zone
in accordance with 33 CFR § 162.240 (b)

3.0 Capacity Increases

The system capacity for moving people and vehicles can be increased in a gradual manner. Table 1 summarizes a likely progression of system and capacity improvements. The table assumes that additional boats will be of similar capacity to the vessel under construction for the

Ketchikan International Airport. It is also important to note that on the short existing route, vessels perform two transit cycles per hour. The longer routes for the additional ferries combined with the 7-knot speed restriction means that the vessels on the new routes perform only one transit cycle per hour.

4.0 Concept Cost Estimates

Acquisition, annual, and life-cycle costs were estimated for the ferry alternative. Estimates were performed for a new route with one ferry and for a new route with two ferries.

Acquisition costs were determined for both the ferries and supporting terminals. Costs for the ferries were determined by parametric techniques using data for similar vessels. Figures 6 through 8 summarize the parametric analyses for vessel cost.

The terminal costs were based on recent cost returns for projects in Ketchikan (upgrading the existing ferry terminal) and on estimates received for a similar project in Prince William Sound (provided by Manson Construction).

Annual maintenance and repair costs for the existing Ketchikan International Airport ferries and terminals formed the basis for estimating annual costs for operating a new route. The existing service corresponds to 460 operating days (one vessel year-round and another for four months). It has been assumed that the new route(s) will operate 365 days per year with one vessel or 730 days per year with two vessels.

Tables 2 and 3 summarize the cost estimates. These tables present a range of values that is commensurate with the approximate nature of these estimates.

5.0 Summary

A rational means of increasing ferry capacity to improve access to Gravina Island is through the addition of new routes and associated vessels. Potential routes and vessels in this document illustrate feasible access improvements. The acquisition and annual cost estimates for increasing ferry capacity provide a means for comparing the ferry alternative to other access improvement concepts.

Table 1
Gravina Access – Ferry Option: Hourly Capacities for Ferry Options

		Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.
Existing	Airport Ferry	300	46	300	46	300	46	300	46	300	46	300	46
	<i>M/V Ellis</i>			260	28	260	28	260	28	260	28	260	28
Route G3	Boat 1					150	23	150	23	150	23	150	23
Ketchikan	Boat 2							150	23	150	23	150	23
Route G1 or G2	Boat 1									150	23	150	23
Refuge Cv. Or Pen. Pt.	Boat 2											150	23
Total		300	46	560	74	710	97	860	120	1010	143	1160	166
		Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.

Projected growth and site suitability will guide the selection of which route to establish first. The sequence noted in the table is only used to portray one option and one alternative development scenario.

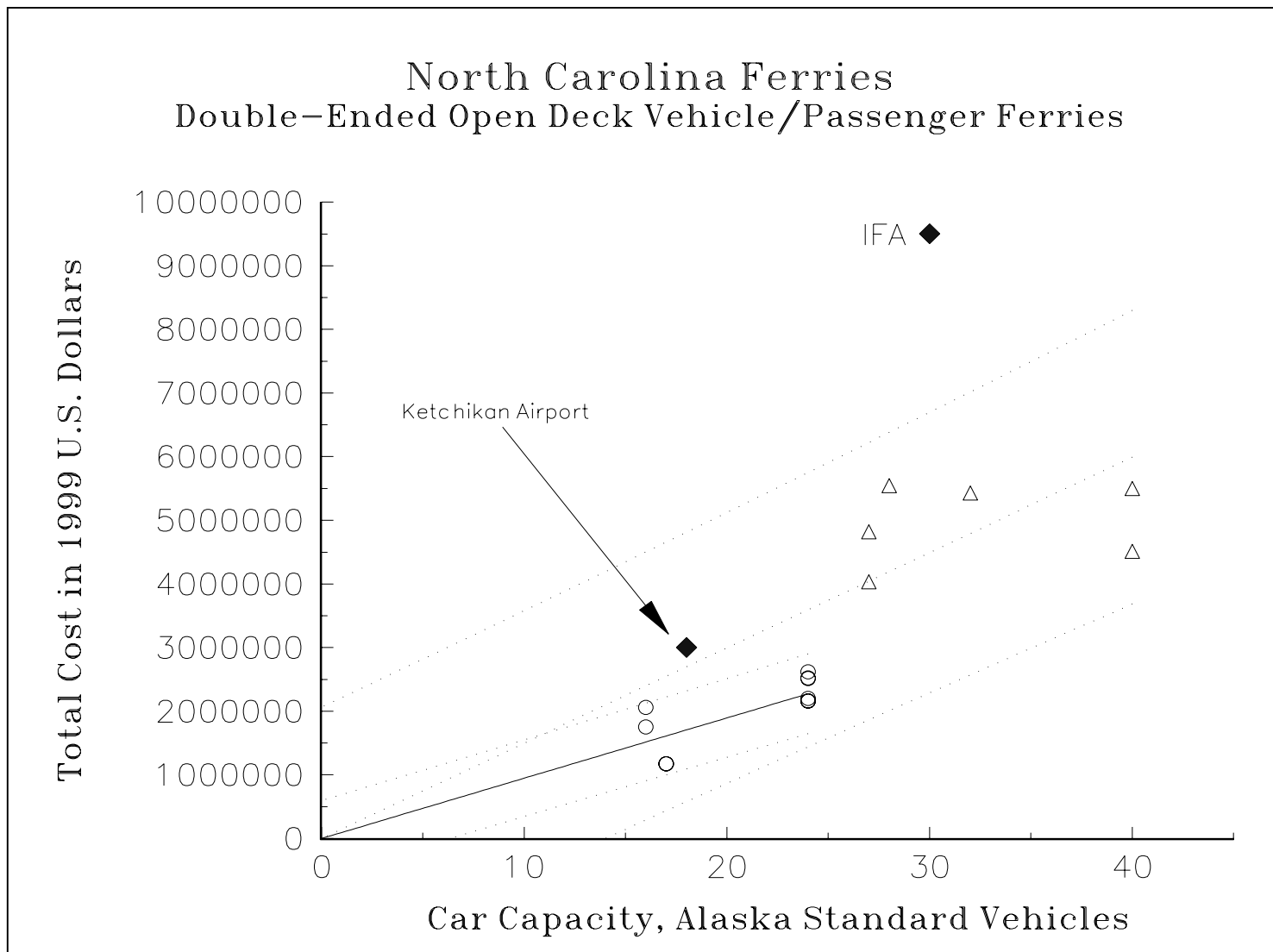


Figure 6
Vessel Cost by Vehicle Capacity

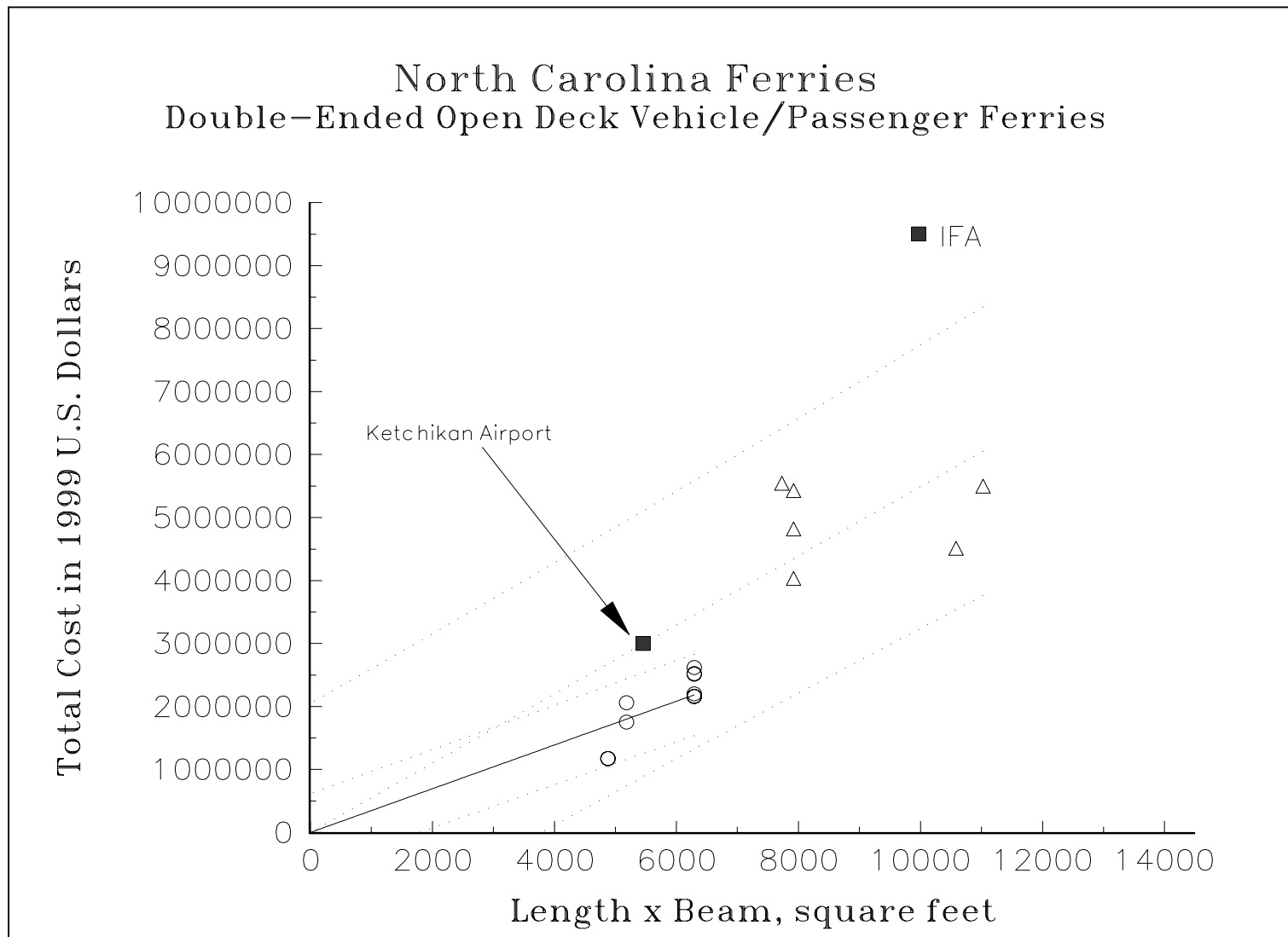


Figure 7
Vessel Cost by Square Feet

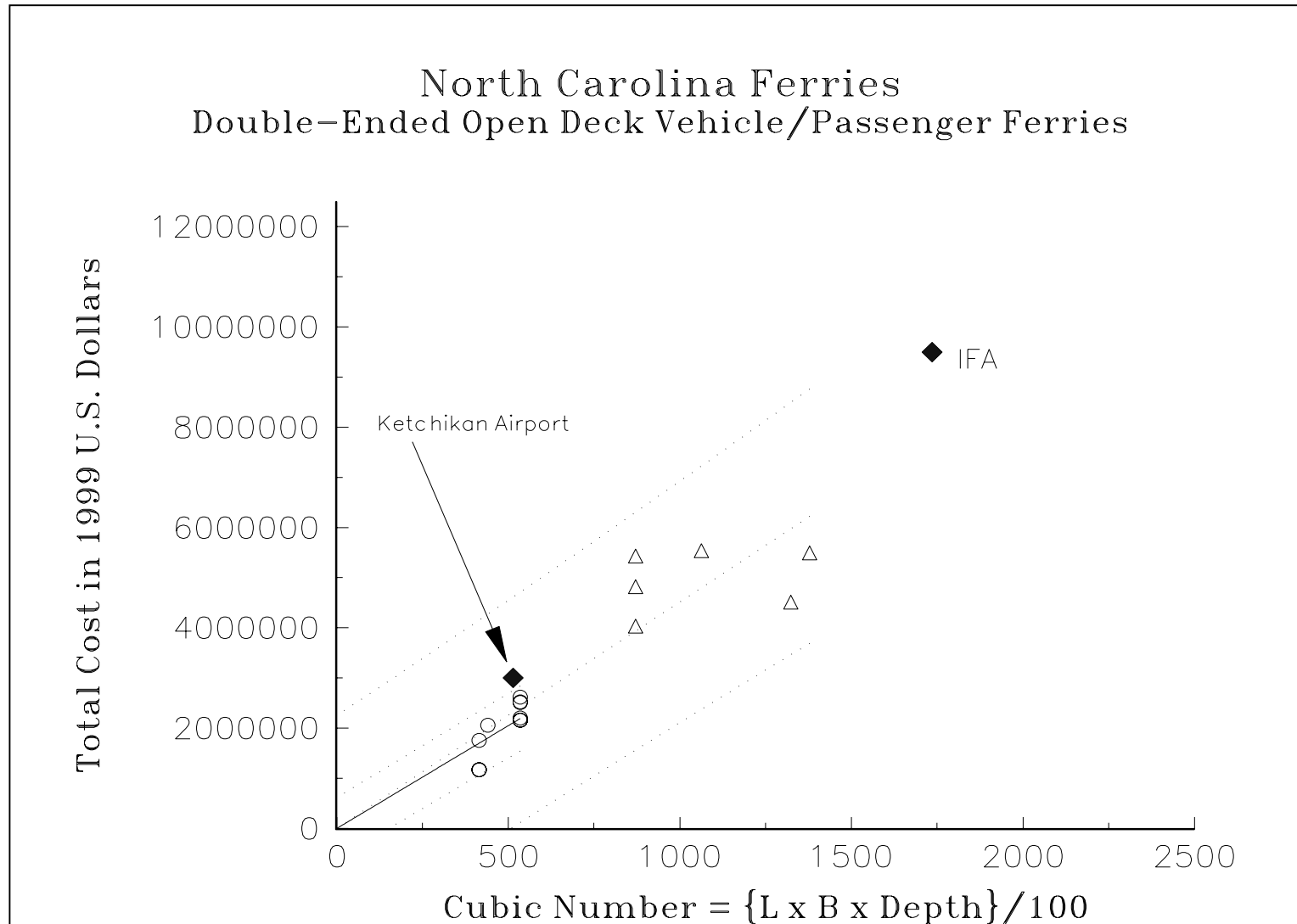


Figure 8
Vessel Cost by Cubic Feet

**Table 2
Costs for Addition of New Route with One Ferry**

	Minimum	Maximum
Vessel Acquisition Cost	\$2,500,000	\$3,500,000
Electrical Power to Ferry Terminals	\$100,000	\$700,000
New Ketchikan Ferry Terminal	\$4,000,000	\$6,000,000
New Gravina Island Ferry Terminal	\$4,000,000	\$6,000,000
TOTAL: (System Acquisition Cost)	\$10,600,000	\$16,200,000
Annual Vessel Operating Costs		
Hull Maintenance & Pass. Services Maint.	\$145,000	\$215,000
Machinery Maintenance	\$1,000	\$3,000
Crew and Toll Collectors	\$550,000	\$650,000
Fuel and Oil (0.95 to 1.50) - 1.52nm route	\$53,000	\$84,000
Overhead	\$125,000	\$150,000
Insurance	\$40,000	\$60,000
Subtotal: (Annual Vessel Operating Cost)	\$914,000	\$1,162,000
Annual Shoreside Operating Costs		
Insurance of Shoreside Facilities	\$20,000	\$30,000
M & R of Shoreside Facilities	\$8,000	\$14,000
Other Costs of Shoreside Facilities Oper.	\$4,000	\$5,000
Subtotal: (Annual Shoreside Costs)	\$32,000	\$49,000
TOTAL: (Annual Operating Costs)	\$946,000	\$1,211,000

**Table 3
Costs for Addition of New Route and Two Ferries**

	Minimum	Maximum
Vessel Acquisition Cost (2)	\$5,000,000	\$7,000,000
Electrical Power to Ferry Terminals	\$100,000	\$700,000
New Ketchikan Ferry Terminal	\$4,000,000	\$6,000,000
New Gravina Island Ferry Terminal	\$4,000,000	\$6,000,000
TOTAL: (System Acquisition Cost)	\$13,100,000	\$19,700,000
Annual Vessel Operating Costs		
Hull Maintenance & Pass. Services Maint.	\$290,000	\$430,000
Machinery Maintenance	\$2,000	\$6,000
Crew and Toll Collectors	\$900,000	\$1,000,000
Fuel and Oil (0.95 to 1.50)	\$106,000	\$168,000
Overhead	\$250,000	\$300,000
Insurance	\$80,000	\$120,000
Subtotal: (Annual Vessel Operating Cost)	\$1,628,000	\$2,024,000
Annual Shoreside Operating Costs		
Insurance of Shoreside Facilities	\$20,000	\$30,000
M & R of Shoreside Facilities	\$8,000	\$14,000
Other Costs of Shoreside Facilities Oper.	\$4,000	\$5,000
Subtotal: (Annual Shoreside Costs)	\$32,000	\$49,000
 TOTAL: (Annual Operating Costs)	 \$1,660,000	 \$2,073,000